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Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No.: CTCE/BBMP/W.No.11/BBU/CSR-02/1083f/CEMENT/2015-16 Date: 29.02.2016

TEST REPORT ON CEMENT

* CUSTOMER	:	**Asst. Executive Engineer**, Vidyaranyapura Sub Division, BBMP, Bangalore.
*AGENCY	:	**Mr. B. B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore – 57.
*NAME OF THE WORK	:	Improvements and Asphalting to Roads at Kuvempunagara 2nd Stage in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.
*REFERENCE	:	EE/BTP/BBMP/E-PMT/219/2015-16 Dated: 16.02.2016
SAMPLE ID	:	Cement
SAMPLE RECEIVED ON	:	27.02.2016
PERIOD OF TESTING	:	27.02.2016 to 29.02.2016

The results of the tests conducted on the cement sample are as follows:

Sl. No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-2013
1	Standard Consistency	IS-4031 (Part -4) 1988(RA-2009)	29.50 %	-
2	a) Initial Setting Time	IS-4031 (Part -5) 1988(RA-2009)	150 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5) 1988(RA-2009)	490 Minutes	Not More than 600 Minutes
3	Soundness by Le Chartlier Method	IS-4031 (Part-3) 1988(RA-2009)	1 mm	Not more than 10mm

*Information is furnished by the Customer/Representative.

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Note:

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⇒ Any Query regarding the report must be reported within 30 days from the date of testing.

****

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Quality Manager

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T-2377

Job No.: CTCE/BBMP/W.No.11/BBU/CSR-02/1083f/SAND-Gradation/2015-16 : 29.02.2016

TEST REPORT ON DETERMINATION GRADATION OF FINE AGGREGATES

* Customer	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
* Agency	: **Mr. B. B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore – 57.
* Name of Work	: Improvements and Asphalting to Roads at Kuvempunagara 2nd Stage in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-PMT/219/2015-16 Dated: 16.02.2016
Technical Reference	: IS : 2386 Part 1 - 1963 RA-2007
Sample ID	: Fine Aggregates
Sample Received on	: 27.02.2016
Date of Testing	: 29.02.2016

Total Wt. of Aggregates in gms **1000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)			
		Zone-I	Zone-II	Zone-III	Zone-IV
10	100	100	100	100	100
4.75	93.50	90-100	90-100	90-100	95-100
2.36	72.00	60-95	75-100	85-100	95-100
1.18	49.00	30-70	55-90	75-100	90-100
600 Micron	26.50	15-34	35-59	60-79	80-100
300 Micron	14.00	5-20	8-30	12-40	15-50
150 Micron	6.00	0-10	0-10	0-10	0-15

* Information is furnished by the Customer/Representative

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Remarks : This sample is under Zone-I specific limits.

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Job No.: CTCE/BBMP/W.No.11/BBU/WMM/Gradation/2015-16 : 04.03.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Mr. B. B. Umesh,**
#385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore – 57.

Name of Work : Improvements and Asphalting to Roads at Kuvempunagara 2nd Stage in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/219/2015-16 Dated: 16.02.2016

Date of Testing : 04.03.2016

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **7210**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	250	250	3.5	96.5	95-100
22.4	2510	2760	38.3	61.7	60-80
11.2	1085	3845	53.3	46.7	40-60
4.75	950	4795	66.5	33.5	25-40
2.36	800	5595	77.6	22.4	15-30
0.600	750	6345	88.0	12.0	8-22
0.075	600	6945	96.3	3.7	0-8

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Job No.: CTCE/BBMP/W.No.11/BBU/WMM/Gradation/2015-16 : 14.03.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Mr. B. B. Umesh,**
#385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore – 57.

Name of Work : Improvements and Asphalting to Roads at Kuvempunagara 2nd Stage in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/219/2015-16 Dated: 16.02.2016

Date of Testing : 14.03.2016

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **7550**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	185	185	2.5	97.5	95-100
22.4	2650	2835	37.5	62.5	60-80
11.2	1025	3860	51.1	48.9	40-60
4.75	985	4845	64.2	35.8	25-40
2.36	865	5710	75.6	24.4	15-30
0.600	790	6500	86.1	13.9	8-22
0.075	650	7150	94.7	5.3	0-8

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Job No.: CTCE/BBMP/W.No.11/BBU/WMM/Gradation/2015-16 : 21.03.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Mr. B. B. Umesh,**
#385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore – 57.

Name of Work : Improvements and Asphalting to Roads at Kuvempunagara 2nd Stage in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/219/2015-16 Dated: 16.02.2016

Date of Testing : 21.03.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **7220**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	190	190	2.6	97.4	95-100
22.4	2450	2640	36.6	63.4	60-80
11.2	1255	3895	53.9	46.1	40-60
4.75	900	4795	66.4	33.6	25-40
2.36	860	5655	78.3	21.7	15-30
0.600	815	6470	89.6	10.4	8-22
0.075	600	7070	97.9	2.1	0-8

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Job No.: CTCE/BBMP/W.No.11/BBU/WMM/Gradation/2015-16 : 30.03.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Mr. B. B. Umesh,**
#385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore – 57.

Name of Work : Improvements and Asphalting to Roads at Kuvempunagara 2nd Stage in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/219/2015-16 Dated: 16.02.2016

Date of Testing : 30.03.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **8260**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	165	165	2.0	98.0	95-100
22.4	2680	2845	34.4	65.6	60-80
11.2	1290	4135	50.1	49.9	40-60
4.75	1050	5185	62.8	37.2	25-40
2.36	1005	6190	74.9	25.1	15-30
0.600	855	7045	85.3	14.7	8-22
0.075	715	7760	93.9	6.1	0-8

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Job No.: CTCE/BBMP/W.No.11/BBU/WMM/AIV/2015-16

04.03.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B. B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore – 57.
Name of the Work	Improvements and Asphalting to Roads at Kuvempunagara 2nd Stage in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/219/2015-16 Dated: 16.02.2016
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	04.03.2016

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	390	395	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	89	90	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	305	
4	Aggregate Impact value = percent fines	22.82	22.78	
	100* (W_2/W_1)%			22.44

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.11/BBU/WMM/S-T/2015-16

04.03.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B. B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore – 57.
Name of Work	Improvements and Asphalting to Roads at Kuvempunagara 2nd Stage in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/219/2015-16 Dated: 16.02.2016
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	04.03.2016

Result : Flakiness Index = **12.54%**

Elongation Index = **13.72%**

Result : Combined Flakiness & Elongation index 26.26%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.11/BBU/SDBC/AIV/2015-16

09.04.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B. B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore – 57.
Name of the Work	Improvements and Asphalting to Roads at Kuvempunagara 2nd Stage in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/219/2015-16 Dated: 16.02.2016
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
28.07.2014	09.04.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	379	380	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	78	79	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	20.58	20.79	20.68

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.11/BBU/SDBC/Shape_T/2015-16 : 09.04.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	: **Mr. B. B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore – 57.
Name of Work	: Improvements and Asphalting to Roads at Kuvempunagara 2nd Stage in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-PMT/219/2015-16 Dated: 16.02.2016
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 09.04.2016

Result : Flakiness Index = **11.82%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index **25.07%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.11/BBU/SDBC/Stripping/2015-16

09.04.2016

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B. B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore – 57.
Name of the work	Improvements and Asphalting to Roads at Kuvempunagara 2nd Stage in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/219/2015-16 Dated: 16.02.2016
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	09.04.2016

Type of binder : 80/100

Percentage of binder used : 5.0% by wt.

Total weight of aggregate : 200 g

Total weight of binder : 10.0 g

Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.1	3.20	96.80
2	3.2		
3	3.3		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.11/BBU/SDBC/Sp_Wa/2015-16

09.04.2016

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B. B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore – 57.
Name of the Work	Improvements and Asphalting to Roads at Kuvempunagara 2nd Stage in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/219/2015-16 Dated: 16.02.2016
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	09.04.2016

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2025	2024	2022	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1270	1269	1267	
4	Weight of saturated surface dry aggregate in air	W_3 g	2019	2022	2025	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	749	753	758	
6	Weight of oven dried aggregate	W_4 g	2010	2015	2003	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.684	2.676	2.642	2.667
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.716	2.701	2.721	2.713
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.45%	0.35%	1.10%	0.63%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No.11/BBU/SDBC/Bitumen/2015-16 09.04.2016

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

CUSTOMER	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Mr. B. B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore – 57.
NAME OF THE WORK	Improvements and Asphalting to Roads at Kuvempunagara 2nd Stage in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-PMT/219/2015-16 Dated: 16.02.2016
SAMPLE I/D	Roads in Kuvempunagara 2nd Stage in Ward No.11BBMP, Bangalore.
DATE OF TESTING	09.04.2016

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	474
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	26.00
7. Bitumen content in %	5.00	5.20
8. Average	**5.10**	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	35.26	7.42	7.42	92.58	90-100
4.75	250.2	52.67	60.10	39.90	35-51
2.36	36.69	7.72	67.82	32.18	24-39
1.18	42.32	8.91	76.73	23.27	15-30
0.3	45.32	9.54	86.27	13.73	9-19
0.075	40.26	8.48	94.75	5.25	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	32.26	6.45	6.45	93.55	90-100
4.75	254.3	50.86	57.31	42.69	35-51
2.36	54.32	10.86	68.18	31.82	24-39
1.18	45.21	9.04	77.22	22.78	15-30
0.3	36.25	7.25	84.47	15.53	9-19
0.075	45.32	9.06	93.53	6.47	3-8

Civil-Tech Consultants & Engineers Bangalore

Note:

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Job No.: CTCE/BBMP/W.No.11/BBU/SDBC/Bitumen/2015-16 13.04.2016

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

CUSTOMER	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Mr. B. B. Umesh,** #385/1, Near Anjaneya Temple, Bettahalasur Village & Post, Bangalore – 57.
NAME OF THE WORK	Improvements and Asphalting to Roads at Kuvempunagara 2nd Stage in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-PMT/219/2015-16 Dated: 16.02.2016
SAMPLE I/D	Roads in Kuvempunagara 2nd Stage in Ward No.11BBMP, Bangalore.
DATE OF TESTING	13.04.2016

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	474.2
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	25.80
7. Bitumen content in %	5.00	5.16
8. Average	5.08	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	32.59	6.86	6.86	93.14	90-100
4.75	254.5	53.58	60.44	39.56	35-51
2.36	35.25	7.42	67.86	32.14	24-39
1.18	40.25	8.47	76.33	23.67	15-30
0.3	42.32	8.91	85.24	14.76	9-19
0.075	41.25	8.68	93.93	6.07	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	33.25	6.65	6.65	93.35	90-100
4.75	257.3	51.46	58.11	41.89	35-51
2.36	52.36	10.47	68.58	31.42	24-39
1.18	46.35	9.27	77.85	22.15	15-30
0.3	35.21	7.04	84.89	15.11	9-19
0.075	40.22	8.04	92.94	7.06	3-8

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